of the digestive ferments might help to cleanse off the membrane; but I have not tried them. Persistent removal with forceps has effected a cure in all cases.

In the grip, we ofttimes have otitis media, not differing from those cases occuring without the grip, except that they are more severe; but the true grippal ear is rather characteristic. The membrana tympani is apt not to be bulging as a whole; but rather in the form of blebs, either filled with clear serum or a sanguineous fluid—ecchymoses of the canal and even small hematomata—a bleb or two on Shrapnell's membrane. The membrana tympani being incised, and each of the blebs opened, there is an escape of bloody fluid and serum. Some of these blebs are on the membrana tympani and not connected with the middle ear. There is much swelling of the mucus membrane and of the submucus tissues of the middle ear, and drainage is only fairly good. The discharge is serous and continues so to the end, unless other infection is added, when it may become more pus-like and profuse. There is apt to be marked pain of the mastoid and in the muscles of the neck, persisting for several days. Iodin painted on, has given me the best results. The existing grippal infection seems to afford especially fertile soil for other infections—hence complications are common and should be carefully watched for.

In scarlet fever, involvement of the ear is common and occurs during desquamation; that is, in the third or fourth week, and the process is exceedingly rapid. It seems to be as a rule, a streptococcus infection engrafted upon the specific scarlatinal infection. Necrosis of the mucus membrane, overlying the bone, occurs early and, the bone being deprived of its nutrition, also necroses. The membrana tympani ruptures early and tends to slough away. Involvement of the mastoid and labyrinth is common. It is the most destructive form of otitis media we have, and the one yielding least to treatment. We therefore should redouble our prophylactic measures, and be most prompt in making a paracentesis.

In diphtheria, the ear is not nearly so frequently involved as in scarlet fever, and there is little tendency to spontaneous rupture of the membrana tympani.

In measles, it is fairly frequent, arising chiefly during desquamation; that is, in the second or third week. The other infectious diseases do not seem to have any especial predilection toward the production of acute otitis media, except by giving rise to congestion of the mucus membrane and so making it more liable to infection—hence reasonable prophylaxis should be exercised in these cases and in the presence of any wasting disease.

In our attention to the ear, the general bodily condition must not be neglected. See that the bowels are kept well cleared out and that proper nourishment is administered.

I desire to enter a special plea for the recognition of the importance of acute otitis media in infancy and childhood. Many an infant has died from meningitis caused by unrecognized acute otitis media and many a child has grown up with a discharging ear, or handicapped by impaired hearing from the same cause. I wish again to call attention under prophylaxis, tothe prominent place colds and abnormal conditions of the rhino-pharynx play in the etiology of acute otitis media; and under treatment, to emphasize the value of early paracentesis and the necessity of asepsis at the time of the incision, and in the subsequent treatment of the ear.

PATHOLOGY OF ACUTE PURULENT OTITIS MEDIA AND INDICATIONS FOR OPERATIVE INTERFERENCE IN ACUTE MASTOIDITIS WITH REPORT OF INTERESTING CASES.*

By CULLEN F. WELTY, M. D., San Francisco.

In the majority of cases, the primary process in the middle ear is that of acute, catarrhal inflammation which is characterized by the presence of the exudate which develops rapidly, accompanied by more or less reaction. This effusion may be purulent or muco-purulent in character and involves the whole of the middle ear, and is usually of short duration (by the middle ear, we mean eustachian tube, tympanic cavity and mastoid cells). The anatomical changes consist of the marked hyperemia which is followed by a muco-purulent exudate into the interstitial tissue of the tympanic cavity, not so much marked in the eustachian tube and the lining membrane of the mastoid cells. This exudate in the middle ear consists of a thick, cloudy fluid mixed with mucus and pus cells, containing many blood vessels. The greatest predisposing factor in the causation of this condition is an obstruction of the eustachian tube.

However, there is another theory that is more popular to-day, and that is of germ infection. The question naturally arises, did germ infection of the middle ear cause the exudate and closure of the tube, or was the exudate produced by the closure of the eustachian tube, and afterwards infected? I am inclined to the theory of germ infection primarily. It must be accepted that acute otitis media has its origin in bacteria infection and that the diplococcus pneumonia and streptococcus pyogenes are most frequently found in the secretion and are the exciting cause of this form of infection.

The following have also been found: Staphylococcus pyogenes alba and aureus, bacillus pyocyaneus, pneumonia bacillus, bacillyus coli, menigo-coccus intercellularis, the diphtheria bacillus in middle ear diphtheria, the tubercle bacillus, the gonococcus, influenza bacillus, the typhoid bacillus in the tympanic cavity of patients who have died of typhoid fever. It was shown by Madoleczny that immediately following paracentises, the secretion cultured in a pure media showed that the streptococcus occurred, just as often alone as in combination with other pathogenic micro-organisms.

*Read at the Thirty-Eighth Annual Meeting of the State Society, Coronado, April, 1908.

Politzer says, undoubtedly the streptococci make their appearance late in the disease and approach by way of the eustachian tube or a rupture of the drum membrane. It is also noted that in such infections, all the symptoms are more aggravated. There is more likelihood of a mastoiditis, an extradural abscess, and cerebral complications of any kind. Individual predisposition, and resistence on the part of the patient have a great deal to do with this whole subject of infection. The invasion of pathogenic micro-organisms into the middle ear takes place most frequently by the eustachian tube. Secondarily, by the lymphatics. The third entrance is by the blood through the walls of the vessels. The fourth entrance from a perforated or intact drum membrane from the external auditory canal. The terminations of an acute middle ear inflammation are: first, rapid recovery; second, the transition of the inflammation into a chronic form of secretary catarrh which either subsides gradually or leads to adhesive changes in the sound conducting apparatus, which constitutes one of the large forms of chronic deafness; third, acute purulent inflammation of the middle ear with perforation of the tympanic membrane; fourth, extension of the inflammation to the mastoid process with consecutive formation of abscess within them; fifth, extension of the process to the dura mater, pia mater, and neighboring sinuses; sixth, death through general septicemia without a diseased condition of the sinuses.

Of the terminations, the one that we will direct our attention to is that of acute purulent inflammation of the middle ear. The inflammatory changes of the mucous membrane are more intense and the discharge which is more copious, contains a greater number of pus cells. The pathologic changes are invariably distributed over the entire mucus membrane of the middle ear. Even in cases where no mastoid symptoms are present, the changes have been found at postmortem. The effect of the chemical bodies, produce the reaction that is characterized by hyperemia, exudation, diapedises, of round cells and the formation of new blood vesels. If the hyperemic stage progresses we find various changes dependent upon the intensity of the inflammation. The mucosa becomes more deeply red or mottled from small hemorrhagic areas, the mucous membrane becomes more swollen, the tympanic cavity is filled with a muco-purulent or purulent exudate, microscopically loosened or exfoliated epithelium.

The sub-stratem is filled with round cells, blood vessels are distended and small hemorrhagic areas are scattered throughout the mucosa. When the inflammation is intense as in scarlatinal otitis, we will notice areas of necrosis scattered throughout the membrane. These areas of necrosis correspond to the deposit of the micro-organisms. It has been clearly proven by Politzer and others that pus may remain in the mastoid cells for a long time and finally become absorbed. However, this condition only takes place under peculiar surroundings. First, pus must not be absolutely confined or it would produce pressure symptoms; second, the micro-organisms must not be of the virulent type. The symptoms of acute purulent inflammation of the middle ear are pain, fever, and general malaise. The most important of these is pain, which is usually very intense, radiating to all parts of the head and down the shoulder of the same side. A complete remission is seldom observed. It is made worse by any effort on the part of the patient. Occasionally, painful points especially on the vertex in the course of the trigeminus. In rare instances the disease is ushered in by vomiting, chill, and vertigo. An elevation of temperature from 1° to 4°. In children the temperature is invariably high.

Appearance of the drum-membrane: In the primary stage there is a congestion about the handle of the maleolus, and the osseous meatus is very much reddened near the membrane. In a few hours the membrane may be scarlet red or livid, ecchymotic and swollen. In the otitis of influenza the membrane is covered with an exudate or with hemorrhagic bulla. The posterior segment is more prominent, which indicates a collection of fluid within the tympanic membrane or within the tympanic cavity. The perforation usually occurs in the posterior inferior quadrant and the anterior inferior quadrant. They are as a rule small and very hard to find. Large perforations are due to the more virulent infections. Double perforations are usually dependent upon tubercular process of the ear.

The Terminations.—The terminations of acute purulent middle ear inflammations are: First, cure by complete restoration of the hearing; second, transition of the purulent inflammation into a seromucous catarrh after cicatrization of the perforation; third, disturbance of hearing after closure of the perforation due to connective tissue adhesions in the tympanic cavity; fourth, permanent loss of hearing due to invasion of the labyrinth in cases of infectious diseases; fifth, inflammation of the mastoid cells. This is especially so in influenza and in infectious diseases; sixth, destruction of the membrane, perforation of the labyrinth, caries and necrosis of the tympanic wall and ossicles with exfoliation of the same. This latter is observed more particularly in scarlatinal and diphtheretic infections, more rarely in measles, typhoid fever and tuberculosis; seventh, probably in death with an intact or perforated tympanic membrane due to cerebral infection; eighth, chronic middle ear suppuration with the many complications that naturally follow.

I have outlined this part of my subject very carefully so as to make each step in the progress of the infection important. It is my belief that when an individual case is studied with such care the threatening symptoms, or rather the symptoms that call for operative interference will be better appreciated. If such a routine is followed, the physician will not be responsible for the death. *You must always bear in mind, that in mastoid surgery a competent man can only do good.* Occasionally a case will be operated that would have recovered

without operation. *On the other hand by delay, in a shorter or longer time a life will be sacrificed.* So reasoning, would it not be better to do ten unnecessary operations rather than sacrifice one?

In a given case of acute purulent otitis, accompanied by pain and redness of the drum membrane, I prescribe calomel 1/10 to 1/5 grain every half hour until one grain is taken, followed in six hours by magnesia. Patient is put to bed; tampon, saturated with hot Burrow's solution put in the ear and gauze about three inches in thickness covered by oiled silk saturated with hot Burrow's solution for the outside to cover the ear and mastoid. In many instances the pain will entirely subside, the drum membrane become pale and the patient be well the next day. However, if the pain does not subside apply additional heat to your outside dressing, which may be either wet or dry. If this does not accomplish what you wish in the course of six or eight hours, the dressing must be removed and the ear examined. By this time it will be noted that there is an intense redness of the drum membrane and more than likely it will be bulging. Some temperature, may or may not be pain on deep pressure over the mastoid, may or may not be bulging of the posterior superior wall of the meatus near the drum membrane. Free incision of the drum membrane is indicated, and the same procedure in regard to the dressing that I have spoken of before. If the symptoms have not been relieved within the following twenty-four hours it is more conservative surgery to open the mastoid process. My reason for this is described in a few words,—*what causes the pain? Retention of pus,* and as the drum membrane has been freely incised, where can the retention be? *The mastoid cells are the only remaining place.* It is more than probable that there will be retention in but one or a few cells. At the same time to delay, subjects your patient to added risk of cerebral complications. No doubt some of you may use and prefer cold applications to the mastoid. I say they should not be used at all for the following reasons: That cold so numbs the parts, that your real symptoms are masked and that is the worst possible thing to wish for. I wish to make another broad general statement at this place. If following a free incision of the drum, the pain is not relieved by the application of moist heat, your case should be operated. A patient with acute mastoiditis should never be given a narcotic of any kind for the reason that it masks the very symptoms that you are watching so carefully.

In another instance you see the patient for the first time on the third day of the disease. The drum membrane has ruptured and there is a small perforation, the plain is not so intense, and the temperature almost normal. Apply the same dressing and medication that I have recommended in the beginning and more than likely it will get well.

Patient seen for the first time on the fourth day, small perforation of the membrane, bulging of the membrane, bulging of posterior superior wall of the meatus, some tenderness of the mastoid region, some temperature; free incision of the drum membrane, with treatment and dressing such has been outlined before. If within 24 hours all the symptoms are not better the safest procedure is that of operation.

After the 10th day of suppuration from the middle ear, with a bulging of the posterior superior wall, an operation should be done at once, without any other indication; it invariably speaks for pus retention. It matters not where you find it, in acute or chronic suppuration. If after the 20th day a profuse discharge continues, it is better, and more conservative surgery to drain. This is not because of retention, but because of large pneumatic cells with extensive inflammation and destruction.

Another indication for operation is where a discharge continues for more than six weeks. During the later weeks adhesions have taken place, and more will follow if allowed to continue. In other words there will be an impairment of hearing, and to avoid this and give your patient the advantage of everything that he deserves, an operation is indicated.

We must bear in mind, that in so operating cases such as I have outlined, the discharge from the ear in many instances will entirely disappear in from four to six days. The delayed cases are the ones that produce the trouble, because of the pathologic changes that take place as the disease progresses and as the retention symptoms develop. If after an acute purulent otitis has progressed steadily for the good, the discharge much lessened, suddenly, pain in the mastoid develops, we should operate at once. If after the drum membrane has entirely healed, there is acute pain in the mastoid region, immediate operation in indicated. Increase of surface temperature over the mastoid region, always speaks for mastoid involvement and the safest procedure is that of operation. Infiltration and edema over the mastoid cells, calls for operation. It may be due to perforation of the mastoid, or to a periostitis produced by diseased mastoid, or to an occlusion of the mastoid vein. Facial paralysis occurring during middle ear inflammation always calls for immediate operation.

You must bear in mind that practically all cerebral complications call for immediate operation. If you are quick enough, you may head off the disease, and save the life of the patient. Desperate diseases require heroic efforts, and at times a mistaken diagnosis may be made, and an unnecessary operation, with a possible fatal termination, that must not deter you from using your best judgment at all times.

Case 1. Referred by Dr. C. L. Biglow, female, 22 years. Wife of a doctor. Always in good health until the present illness which began 24 hours ago with very acute pain in the right ear. She was given a purge, and the various kinds of drops for the relief of pain, but with slight effect. I was called the morning of the second day, found the patient had a temperature of 101°, very acute pain in the ear, which radiated to the whole side of the head.

The surface temperature of the mastoid increased in comparison with the other side. Sensitive to pressure and percussion over and about the mastoid, bulging of the membrane with small perforation in

the posterior inferior quadrant. Made free incision of the membrane and applied dressing as before spoken of. Told patient that if she was not improved by the following day, an operation was indicated and would have to be done at once. The following 24 hours, the pain was probably as severe as before. A very restless night, requiring morphine. Following morning, the temperature was 102.5°, surface temperature increase, bulging of the posterior and superior wall. Not so much pain because of the morphine. Entire side of the head sensitive to pressure and percussion. Operation two hours later.

Operative Findings.—Large pneumatic mastoid. The individual cells had broken down making one large cavity which was completely filled with saneaous pus and was under considerable pressure. Attic opened and operation completed. Bacteriological examination, pure cultures of streptococci. These findings explained the rapidity of the progress. Ear free from pus in six days. Posterior wound healed completely in 16 days. Three weeks following the operation, hearing normal. This case illustrates very beautifully how necessary it may be to operate early.

Case 2. Clinical Case: Male, 27 years. Traveling salesman. Always in good health until the present illness which began three weeks ago, with acute pain in the left ear. This increased in severity for a short time and was relieved when the ear began to discharge. Since that time has not troubled him much with the exception of an increasing fullness on that side of the head for the last ten days. The discharge from the ear has become very offensive.

Examination.—Temperature, normal, no pain on this side of the head complained of. On deep pressure, pain is elicited over the tip of the mastoid. No increase of surface temperature. Bulging of the posterior superior wall was so great that the landmarks of the tympanic cavity could not be seen at all. Bulging of the membrane and a small perforation low down. Immediate operation advised and done.

Operative Findings.—Large pneumatic mastoid. All the cells destroyed. Pus under considerable pressure. Attic opened. Free incision of the drum membrane. Bacteriological examination; pneumonic infection. Ear dry in four days. Posterior wound healed completely in ten days. The patient left immediately.

As to the ultimate outcome of the hearing, I am not able to say. As to the discharge of pus, continued for about six weeks prior to operation. If his hearing is impaired at all, it is due to the delay of an early incision of the drum membrane which would probably have relieved all his symptoms. I report this case to show you the importance of the bulging of the posterior superior wall occurring late in a purulent otitis. This was my only indication for operation.

Case 3. Referred by Dr. Marshall: Infant 11 months. Bottle-fed baby. Never had infectious disease. Never entirely healthy. Three months ago noticed that for several days the child was very restless and had fever and a discharge of pus from the right ear. Shortly a swelling appeared back of the ear that was incised (Wild's incision) and a teaspoonful of pus discharged. Was dressed every second day for two weeks and healed. Shortly following swelling appeared back of the ear and at the outer angle of the eye of the same side. Both incised and dressed every second day for about six weeks. Neither wound would heal. The discharge of pus continued from the ear following all three operative procedures. Finally the case was referred to me. The child was much emaciated, suffering very much from malnutrition. By probe, roughened bone was detected back of the ear. Could not detect anything by a probe from the sinus at the other side of the eye. The meatus was so swollen that I could not see the membrane at all. The discharge from the ear was foul and offensive. Temperature 102°. Pulse very rapid.

Operative Findings.—In infants the mastoid cells are not developed, so I knew the perforation must be above and back of the ear, i. e the antrum was perforated. This perforation was made quite large to allow free access to the discharge of pus and further search made for the fistulous communication which was not found. However, I did find roughened bone above the perforation. In curetting it away the dura was uncovered and the operation was completed after an incision of the drum membrane, which could not be seen. Wounds and ears dressed every second day. Discharge from the fistula about the eye stopped in four days. Discharge from the ear stopped in three weeks. Discharge from the fistula back of the ear stopped in four weeks. Child apparently well and has remained so.

I speak of this case particularly to show you the fallacy of Wild's incision which should never be used at all. Had this patient had the proper attention at first, there would not have been a fistula and the patient and the family would have been relieved of much trouble and great anxiety. The fistula about the eye was due to the roughened bone above the perforation, and when removed the fistula closed. By enlarging the bone perforation and free paracentesis, good drainage was established, and the child made a recovery.

Case 4. Referred by Dr. Kugler: Female, 18 years old. Acute purulent otitis for the last four weeks. Some pain during the first week. Practically no discomfort until a few days ago, when a swelling was noticed back of the ear. Temperature 102°. She had been treated by the family physician, who told her to syringe the ear twice a day, and everything would be all right.

Examination.—Four weeks after the initial onset. Increased surface temperature over this mastoid in comparison with the other. Temperature 102°. Pulse 180. Indefinite pain over the whole side of the head. A decided swelling of the mastoid and particularly painful over the mastoid. Pus very offensive. There was so much bulging of the posterior superior wall that the drum membrane could not be seen at all. Immediate operation advised and done.

Operative Findings.—A perforation of the tip of the mastoid with considerable extravasation of pus. The whole of the mastoid, which was of the pneumatic variety, was filled with pus and granulation tissue. which was under considerable pressure. The whole of the tip of the mastoid had to be removed and the attic was opened. A free paracentesis of the drum membrane. Packed with iodoform gauze. Because of extensive disease of the mastoid and the involvement of the sinus, I feared very much a sinus thrombosis. However, the temperature soon dropped to normal, and never reached 99° after. The ear was free from pus at the second dressing. The case made an uneventful recovery, with hearing unimpaired. This case again illustrates what extensive disease may take place with but a few symptoms. It further illustrates that general practitioners should not deal with such cases. I am thoroughly convinced that there was a bulging of the posterior superior walls in this particular case a week following her original infection.

Case 5. Referred by Dr. J. B. Hanna. Female, 35. Has had an acute otitis for the last five weeks. Has had various kinds of drops and soothing applications for the relief of pain. Has had hot and cold applications to the ear without relief. More or less pain over the whole side of the head for the last two weeks.

Examination.—Temperature 101°. Increased surface temperature of this mastoid. Tenderness of the whole of the mastoid and particularly over the tip. A bulging of the posterior superior wall. A small perforation in front and below. Advised immediate operation because of the duration of the disease with bulging of the posterior superior wall and increase of surface temperature, added to the sensitiveness on pressure. Operation recommended and done on the following day.

Findings.—After a free paracentesis, the operation was done in the usual way. Large pneumatic mastoid. Each individual cell as well as the antrum was filled with edematous membrane. I called this edematous mucous membrane. I do not know a better name for it. As the individual cells were cut across, this mucous membrane or possibly granulation tissue would bulge from the cavity. Pus was not found in the cells, but was found in the antrum. My explanation of this pathological condition is that the inflammation had begun to subside. No doubt all these cavities were primarily infected to produce the condition spoken of. However, I am of the opinion that had the operation not been done she would have had a brain infection. The discharge from her ear had entirely ceased at her first dressing. The posterior wound had healed in four weeks. Hearing impaired because of long duration of discharge.

Case 6. Child 6 years old. Has had pain in her ear off and on for the last week. Considerable tenderness over the mastoid. Temperature 101°. Pulse 120. No increased surface temperature. The pain at night is so intense she cannot sleep. Relieved by hot applications.

Ear Examination.—A bulging of the posterior superior wall which extends into the drum membrane. The drum membrane is very red. A free paracentesis was advised and done, and the same treatment carried out that I have recommended before. The following day the temperature had dropped to normal, there was not so much tenderness over the mastoid. A hot compress and hot tampons were again applied. The patient resting very comfortably during the day and night complaining of no pain whatever. The third or fourth day following the paracentesis a bulging appeared in the posterior superior wall. Temperature 101°. Pulse 120. Did not complain of pain. However I recommended operation. Done the same day. I again incised the drum membrane and did the operation in the usual manner. A pneumatic mastoid. The mucous membrane of each cell was so inflamed that it completely filled the cell. I did not encounter pus until I got into the antrum. The mucous membrane at this place had the same appearance as that of the cells, besides it was bathed in pus. The ear was dry about ten days after the operation. The posterior wound closed in three weeks. Following the operation she continued to have some pain in the mastoid region and some temperature. The only way that I can account for this is that I overlooked an individual cell that went on to the formation of pus, breaking its way through to the operative field, or because of the virulence of the infection which was improved by the application of a bi-chloride dressing. Otherwise this case made an uneventful recovery.

Case 7. Referred by Dr. H. C. Moffit: Infectious sinus thrombosis from delayed operative interference, in a case of mastoditis of four months' duration. Reported in full in "California State Journal of Medicine." This case illustrates very beautifully the cerebral complications that are sure to follow if not operated. Made complete recovery.

Case 8. Clinical case: Fracture of base of skull followed by acute purulent otitis, mastoiditis, infectious sinus thrombosis. Four weeks since accident. Recovery. This case again illustrates very beautifully the importance of early operative interference, especially when associated with fracture of the base. Reported in full in the "California State Journal of Medicine."

In conclusion I wish to say that the bulging of the posterior superior wall of the meatus is almost a constant factor with pus retention. That more significance should be directed to this purulent condition. That the absence of fever and pain must not be taken into consideration when you have a bulging of the posterior superior wall. That the presence of fever and pain without bulging of the posterior superior wall must be indications sufficient to warrant operation especially when coming on late.

In a series of twenty-seven cases, hearing was impaired in two due to delayed operation. Hearing unimpaired in the balance. All the cases are absolutely well.

The longest duration for closure of the posterior wound was six weeks in two cases. The shortest ten days. The longest duration for pus from the meatus was four weeks in one case, the shortest my first dressing. The average about six or ten days.

All the cerebral complications developed from delayed operative interference.

If you follow my suggestions you may do an occasional unnecessary operation, but I am confident that your patient will not die of cerebral complications.

I do not mind repeating a statement I made at the Ear Section of the American Medical Association, June, 1907. Acute cases of mastoiditis should never terminate fatally, and I am confident they will not if they are operated soon enough.

DISCUSSION OF THE SYMPOSIUM ON OTITIS MEDIA.

Dr. A. C. Rogers, Los Angeles: So far the subject has been gone into very extensively and very satisfactorily. The gentlemen who have read the papers have passed over one point and another in the most satisfactory manner, and I feel entirely incompetent to add anything except this one thing: I believe we should urge upon our brother practitioners, the men who are doing the practice of medicine in their respective localities, that they should form and follow this invariable rule, that every sick child presenting the common symptoms of fever, and pain, or restlessness, or unconsciousness, should have a careful examination of the external ear.

Dr. E. W. Fleming, Los Angeles: The time allotted for discussion is so short that it would be impossible to cover all the points brought up by Dr. Hastings in his most comprehensive and interesting paper. I am on the program to discuss his paper and therefore mention it particularly. I shall touch only briefly upon a few of the points dwelt upon by the essayists. If all cases of mastoiditis following acute otitis media coming to us for an opinion corresponded to that class in which all the classical inflammatory manifestations, both at the fundus of the ear and in the mastoid region, are present, the duty of the surgeon is plain. Recovery, however, even in this type of cases has occurred in my practice in patients who refused operative interference of any kind. Two types of mastoiditis frequently met with are, first, those cases where the manifestations of inflammation in the mastoid bone are especially pronounced—while the drum membrane and deeper canal appearances are at no time well defined—and